

REMARKS

Favorable reconsideration of this application is respectfully requested in light of the following remarks, wherein Claims 1 and 6 are amended.

As an initial matter, Applicants express gratitude to Examiner Nguyen for the courtesies granted to Applicants' attorney during the recent interview. During the interview, Applicants' attorney noted the differences between the present invention and the combined references. The Examiner agreed that the presently claimed invention appeared to define over the art. Accordingly, Applicants are submitting remarks below consistent with the subject matter discussed during the interview.

Claims 1 and 6 stand rejected under 35 U.S.C. §112, second paragraph, for allegedly being indefinite. As a result, Claims 1 and 6 are amended to remove these informalities. Accordingly, withdrawal of the rejections based upon 35 U.S.C. §112, second paragraph, is respectfully requested.

Claims 1-3 and 6-7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,055,042 to *Sarangapani* in view of *Makela et al.* (WO 02/093282) and further in view of U.S. Patent No. 5,572,428 to *Ishida et al.*

Independent Claim 1 defines a method of preventing a mine vehicle from colliding, the mine vehicle comprising at least a movable carrier that is driven in a first movement direction and in a second movement direction, at least one scanner, and a control system including at least a first control unit arranged on the carrier; the method comprising determining for the mine vehicle at least one safe area provided within an area between minimum distances and maximum distances determined with respect to the vehicle ; scanning the environment in front of the vehicle when driving the vehicle in one movement direction; carrying out a first collision examination wherein the safe area in front of the vehicle is

monitored, and issuing a collision warning message if an obstacle is detected within the safe area, determining also at least one sideward safe area for the vehicle, determining an obstacle-free route on the basis of scanning results, and determining points in a sideward direction of the vehicle to restrict the route; forming memory points on the basis of coordinates of the points restricting the route, and storing the memory points in the control system and carrying out a second collision examination wherein at least one sideward safe area of the vehicle is monitored, and issuing a collision warning message if even one of the memory points resides within the safe area being monitored.

Independent Claim 6 defines a mine vehicle comprising at least a movable carrier that is driven in a first movement direction and in a second movement direction, at least one scanner, a control system including at least a first control unit arranged on the carrier; and wherein at least one scanner is configured to scan the environment in front of the vehicle in order to detect obstacles; at least one safe area defined by minimum distances and maximum distances determined with respect to the vehicle is determined in the control system; and which control system is configured to monitor scanning results and to issue a collision warning message if an obstacle is detected within the safe area in front of the vehicle, and wherein in the control system, at least one safe area in a sideward direction of the vehicle is further determined, the control system allows several memory points including their position information to be stored therein the memory points defining sideward points of the route and based on the scanning results, and the control system is configured to monitor at least one sideward safe area of the vehicle and to issue a collision warning message if even one of the memory points resides within the safe area being monitored.

An advantage of the invention is that the vehicle no longer includes unmonitored sections as far as the collision examination is concerned. See paragraph [0008] in the

published application. Applicants submit that none of the art of record, in combination or alone, disclose the patentable features of independent Claims 1 and 6.

In contrast, *Sarangapani* discloses a mine vehicle provided with a near and far range sensor system for detecting obstacles in the path of the vehicle, as is mentioned on column 2, lines 5 and 6, and in independent claims 1 and 19. On pages 3-4 of the Office Action, the Examiner concedes that *Sarangapani* fails to disclose, in addition to other features, the steps of determining also at least one sideward safe area of the vehicle, determining an obstacle-free route on the basis of scanning results, and determining points in a sideward direction of the vehicle to restrict the route; forming memory points on the basis of coordinates of the points restricting the route, and storing the memory points in the control system; and carrying out a second collision examination wherein at least one sideward safe area of the vehicle is monitored. The Examiner seeks to rely upon *Makela* for disclosing these features. However, *Makela* is completely deficient for disclosing these features.

In particular, *Makela* relates to improving the positioning of a mine vehicle, which vehicle utilizes dead reckoning method. Because of skidding of the vehicle wheel, the dead reckoning is not accurate. See, e.g., chapter [0005], lines 9 to 19. To avoid this issue, *Makela* discloses determining a profile of a wall surface surrounding the route of the vehicle and to compare the obtained wall surface profile to the stored profiles of the known wall surfaces. See, e.g., chapter [0007], lines 30 to 33. As soon as skidding of the wheels is detected, the position of the vehicle is determined solely by comparing the wall surface profiles obtained from the measuring means with the wall surface profiles stored in the memory. See page 4, lines 4 to 7. Thus, the wall profile detection of *Makela* relates only to updating the positioning data and it has nothing to do with collision examination and utilization of sideward safe areas according to the present invention.

Moreover, Applicants do not agree with the comparisons made by the Examiner between the claimed invention and the method and device described in *Makela*. Firstly, the Examiner states that determining of the wall surface profiles by measuring means in *Makela* is the same as determining at least one sideward safe area for the vehicle. This is not true. There may even be obstacles, such as rock blocks, between the vehicle and the wall surface since the only purpose in *Makela* is to detect the profile of the wall surface in order to update the position data. The system of *Makela* does not include any sideward safe area.

Secondly, the Examiner states that determining the corrective measures required in *Makela* is the same as determining an obstacle-free route on the basis of scanning result. However, in *Makela*, the wall surface profile is measured and the obtained measuring result of the wall profile is compared to the known wall profiles. The corrective measure in *Makela* is updating the position data of the vehicle, not determining any obstacle-free route.

Thirdly, the Examiner states that obtaining wall surface profiles in *Makela* is the same as determining points in a sideward direction of the vehicle to restrict the route. In *Makela* the wall profiles are detected only for updating the positioning data. This is why *Makela* does not disclose using the measuring units for restricting the route of the vehicle.

Fourthly, the Examiner states that the claimed features of "forming memory points on the basis of coordinate of the points restricting the route" and "carrying out a second collision examination wherein at least one sideward safe area is monitored" are disclosed in *Makela*, since in *Makela* the detected wall surface profiles are compared with the wall profiles stored in the memory and correcting measurement is performed if any deviation is detected. As discussed above, *Makela* does not disclose determining points in a sideward direction of the vehicle to restrict the route. In *Makela*, no memory points are being formed on the basis of coordinates of the points restricting the route. Furthermore, in *Makela*, there is no kind of

disclosure about carrying out any kind of collision examination. Accordingly, *Makela* does not make up for the foregoing deficiencies of *Sarangapani*.

Finally, the Examiner seeks to rely upon *Ishida* for disclosing the feature of issuing collision warning messages if an obstacle is detected within the safe area and if even one of the memory points resides within the safe area being monitored. *Ishida* discloses an anti-collision system that estimates paths of two vehicles having crossing travel paths. The system calculates a possibility of collision between a source vehicle and an object vehicle. In order to avoid collision, the system controls the velocity of the source vehicle, as is described in column 2, lines 19 to 44, and is clearly shown in Figures 1 and 2.

In *Ishida*, areas of movements are being set for the source vehicle and for the object vehicle. The collision estimation is based on the area of travel of the source vehicle and the area of travel of the object vehicle. The collision probability degree is defined as a value corresponding to an overlapping amount of the distribution of the source vehicle and the distribution of the object vehicle at the same time point, column 10, lines 60-63. Thus, *Ishida* does not disclose at least one sideward safe area on the basis of scanning results and it does not disclose forming memory points on the basis of the points restricting the route.

According to the Examiner, *Ishida* teaches to issue a collision-warning message if an obstacle is detected within the safe area and if even one of the memory points resides within the safe area being monitored. As mentioned above, *Ishida* does not disclose forming memory points on the basis of the coordinates of the points restricting the route.

Furthermore, *Ishida* teaches to issue a warning to a driver of the source vehicle only when the control means controls the velocity of the source vehicle, column 3, lines 28 to 31, and claim 7 on column 12. Accordingly, *Ishida* does not make up for the foregoing deficiencies of *Sarangapani* and *Makela*.

Finally, even if one having ordinary skill in the art would combine the references in the manner suggested the Examiner, the claimed invention would not result. As discussed above, *Sarangapani* teaches to detect obstacles in the path of the vehicle by using the near and far range sensor system. *Makela* teaches to update the position of the vehicle on the basis of the wall profiles. There is no teaching about collision examination. *Ishida* teaches a system that calculates a possibility of collision between two vehicle having crossing travel paths, and based on that determination, velocity of one vehicle is influenced.

If, for some reason, the teachings of these three documents were combined, as the Examiner suggests, the end result would not correspond to the present invention. Instead, the vehicle would include a scanning system detecting obstacles near and far in the path of the vehicle (*Sarangapani*) and it would be provided also with the anti-collision system of *Ishida*, whereby the possibility of collision with some other vehicle would be estimated and the speed of the vehicle would be adjusted in order to avoid the estimated collision. Furthermore, the vehicle would be provided with the dead reckoning positioning system of *Makela* including also the updating system of the position as taught in *Makela*.

The end result of the combination would not have a sideward collision examination system according to the present invention. According, the method and device of independent Claims 1 and 6, and the claims depending therefrom, are patentable over the combined documents. Accordingly, withdrawal of the rejections of record and allowance of this application are earnestly solicited.

Should any questions arise in connection with this application, or should the Examiner believe a telephone conference would be helpful in resolving any remaining issues pertaining to this application, it is respectfully requested that the undersigned be contacted at the number indicated below.

EXCEPT for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§ 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account 50-0573. This paragraph is intended to be a CONSTRUCTIVE PETITION FOR EXTENSION OF TIME in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully Submitted,

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